

A Grower's Guide

Borage

Borago officinalis

Bees enjoy the prolific flowers of this green and prickly plant. Young leaves taste like cucumbers. Celtic warriors drank borage-flavored wine to give them courage. Modern research has shown that the plant stimulates the adrenal glands, encouraging the production of adrenaline. The pretty blue flowers have been added to salads since Elizabethan times to “make the mind glad.” The fresh leaves may cause contact dermatitis.



Family: *Boraginaceae*

Life cycle: Herbaceous annual

Native: Mediterranean region of Europe

Height: 3 feet

Sun: Full sun to partial shade

Soil: Any soil. Well drained, moist is best.

Water: Moderate. Does not tolerate drought.

Flowers: Blue to pink star-shaped flowers in loose racemes that bloom all summer long

Propagation: Sow indoors or plant seed directly outdoors in late spring. Seed is easy to start and needs no special treatment. Cover seed two times their thickness and space 15 inches apart. Seed will germinate in seven to 14 days with a 75 percent germination rate. Borage will reseed easily but does not mature all at once.

Harvesting: Leaves, stem, flowers and seed are harvested when plant is in flower with seed beginning to form. Bee hives are needed for pollination if this crop is grown for seed.

Parts used: Leaves and flowers used fresh or dried. Due to high water content, some recommend drying at a higher temperature than most herbs (40°C). Seeds are harvested for their oil content.

Used as: Infusion, tincture, juice, syrup, lotion, crystallized, elixir, lozenge, capsules

Food uses: Use young leaves as a boiled pot herb, finely shredded in spring salads, and fresh or candied flowers.

Medicinal benefits: Borage oil used as an astringent and as a sequestering agent. The oil contains gamma-linolenic acid (17 to 25 percent) and linoleic acid. The tannins in borage leaves have an astringent effect.

In folk medicine, borage is used for coughs and throat illnesses, an anti-inflammatory agent for kidney and bladder disorders, and as an astringent to treat rheumatism. Similar to comfrey, borage leaves contain potentially liver-toxic and carcinogenic pyrrolizidine alkaloids. Risk may outweigh benefits for internal use.

Market potential: Moderate. Prices range from \$4.70 to \$30.42 per pound (lb) dry weight for leaves. No wholesale or retail price found for seeds.

Summary of field trial data: This plant appears to have good vigor at most locations in Kansas, but leaves are easily damaged by wind, insects and disease. Early summer harvest would optimize quality. Irrigation is required in dry areas. Seed yield was not estimated in this trial. Market potential is not high, because of new warnings of liver toxicity.

K-State Field Trial Data 2000-2002 *Borago officinalis*

				Average	Comments
Age of plants in years	1	2	3		
Number of test sites¹	5	1	0		Borage is an annual crop. Second year were measurements of a volunteer crop.
Survival rate (%)	53.5	—	—	53.5	Better survival could probably be obtained if one was more attentive to irrigation needs early in the season.
Vigor rating²	3.7	4.5	—	4.1	
Height (cm)	53.4	—	—	53.4	
Dry weight herb (g/plant)	180.0	98.3	—	139.5	
Dry weight root (g/plant)	7.2	5.8	—	6.5	
Maturity rating³	4.8	4.0	—	4.4	
Insect damage rating⁴	2.3	0.5	—	1.4	Significant leaf damage is observed late in the season due to insects and disease.
Disease rating⁵	2.1	2.0	—	2.1	Early summer harvest could avoid most of this damage.
Estimated planting density (number of plants/A)	27,787	—	—	—	
Plant density⁶	14,915	—	—	—	
kg/A dry weight (g/plant x plant number) – tops	2,685	—	—	—	
Estimated marketable yield (dry weight lbs/A) – tops	5,913	—	—	—	
Yield x ½ of low price¹	\$13,896	—	—	—	
Yield x ½ of high price¹	\$89,937	—	—	—	

¹ See "How Data Were Collected," on page 3.

² Vigor rating (1=very poor, 3=slightly above average, 5=very good, well adapted)

³ Maturity rating (1=vegetative, 2=early bud, 3=early flower, 4=full flower, 5=seed production, 6=senescence)

⁴ Insect damage rating (scale of 0 to 5; 0=no damage and 5=severe damage)

⁵ Disease rating (scale of 0 to 5 with 0=no damage and 5=severe damage)

⁶ Calculated as starting plant density x survival rate.

How Data Were Collected

The plants described in this fact sheet were grown in K-State test plots in Hays, Colby, Wichita, or Olathe, Kan. Generally, four replications of each species were included at a site. Not all species were screened at each site or each year. The number of locations is noted in the table. Depending on the location and year, either five or 10 plants per plot were established in each of the replications. Details can be found at www.oznet.ksu.edu/ksherbs. Plants were grown from seed in the greenhouse and transplanted in the field in May or June.

All plants at each location were used to determine survival percentage, vigor rating, insect damage rating, and disease rating as described above. Three plants per plot were measured for height, and only one plant per plot was harvested to measure yield each year. Because there were four plots, this allowed us to estimate yield from four plants at each location per year.

Plants were dried, and top and root weights recorded in grams. Grams per plant were converted to kilograms per acre (kg/A) and pounds per acre (lb/A) to estimate field-scale yield. The population density used to calculate field yields was the optimal population density (determined by the average size of the plants) times the actual percentage survival as measured in the field. There was generally some loss due to transplant shock and, for some species, significant winter loss as well.

Plant spacing recommendations on each fact sheet are for spacing within a row. Distance between rows will depend on the particular farming operation and equipment used. The minimum row spacing will be the same as the plant spacing recommendation. For example, if the recommendation is to set plants 12 inches apart, rows should be a minimum of 12 inches apart as well. However, if cultivator or root-harvesting equipment is on 5-foot centers, plant rows 5 feet apart to facilitate cultivating and harvesting. Adjust estimated plant density per acre on the worksheets to estimate gross yield and net income.

Prices were taken from Appendix B of K-State Research and Extension publication S-144 *Farming a Few Acres of Herbs: An Herb Growers Handbook*. To calculate a rough gross income potential for each herb, estimated yield was multiplied by the lowest and the highest retail price, divided by two. This is a rough estimate of wholesale price. Actual prices would be determined based on a contract obtained from a buyer.

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